

Title of Invention  
ION CURLING IRON AND STRAIGHTENER

SUMMARY

**[0001]** Preferred embodiments of the present disclosure include hair styling devices, including curling irons and flat straighteners, with or without fast heat-up performance, that also generate negative ion airflow. The negative ion airflow system includes an ion generator whose output is coupled between positive and negative electrode arrays.

Preferably, the positive electrode array includes pointed electrodes and the negative electrode array includes annular-like electrodes having a central opening coaxial with the associated pointed electrode. Preferably, the annular-like electrodes are formed from a single sheet of metal by extrusion or punching such that the surface of the annular-like electrodes is smooth and continuous through the opening through which the air flows.

**[0002]** The negative ion system further includes a small DC motor with a fan that creates airflow to safely push the negative ions out the curling iron barrel or the flat plates of the straightener via small openings and safely onto the user's hair.

**[0003]** In certain embodiments, the hair styling curling iron also incorporates a unique feature through its flipper/tong design. A preferred flipper/tong design incorporates the flipper/tong within the handle, eliminating the previous cumbersome and bulky thumb grip designs. This new flipper/tong design prevents the user from having to extend their finger and thumb in order to actuate the flipper, and reduces the risk of burning of the fingers or thumb as in conventional thumb grip designs.

**[0004]** Throughout this disclosure, unless the context dictates otherwise, the word "comprise" or variations such as "comprises" or "comprising," is understood to mean "includes, but is not limited to" such that other elements that are not explicitly mentioned may also be included. Further, unless the context dictates otherwise, use of the term "a" may mean a singular object or element, or it may mean a plurality, or one or more of such objects or elements.

BRIEF DESCRIPTION OF THE DRAWINGS

**[0005]** The following drawings form part of the specification and are included to further demonstrate certain aspects of preferred embodiments of the disclosure.

- [0006]** FIG. 1 is a perspective view of a curling iron.
- [0007]** FIG. 2 is a bottom plan view of a curling iron.
- [0008]** FIG. 3 is a cross-sectional view of a curling iron with the flipper in the closed position.
- [0009]** FIG. 4 is a cross-sectional view of a curling iron with the flipper in the open position.
- [0010]** FIG. 5 is a cross-sectional view of a flat straightener.

#### DETAILED DESCRIPTION

**[0011]** One preferred embodiment of the disclosure is shown in Figure 1. The curling iron includes a housing **22**, including a housing top **14**, housing bottom **15**, and cap front **16** that form a handle portion and a barrel **24** extending from the handle portion **23**. Also seen in the perspective view of Figure 1 is the switch actuator **13** that controls the power switch **12**, and the flipper actuator **8**. It is understood that in the curling iron and/or flat iron embodiments, a single switch may control the heating function and the ion flow system, or they may be controlled by separate switches. The flipper **7** is shown lying along the length of the barrel in the closed position. As is standard in the art, the flipper is configured to hold a portion of a user's hair against the heated barrel for styling the hair. During use, the barrel is heated, and then a user may roll a portion of hair around the barrel with the flipper in the open position, and then close the flipper to hold the hair against the heated barrel. The embodiment shown also includes an ion generator and fan in the housing for directing ions onto the hair of a user. The housing thus provides air inlet vents **25** for air intake and small openings **26** in the underside of the barrel **24** for flow of ions onto the hair as shown in Figure 2. Other advantageous features of the curling iron shown in Figure 1 include the power cord swivel **21**, which allows the curling iron to be rotated without tangling the power cord, and a cool tip **20** for the safety of the user.

**[0012]** A cross section of a curling iron embodiment is shown in Figure 3. A power cord is connected to the curling iron through the power cord swivel **21**, and provides power to the switch **12**. When the switch is actuated, power is supplied to the heater assembly, which includes the heater **18**, heat sink **17**, and heater sleeving **19**, all contained within the barrel **24**. Actuating the switch **12**, thus heats the barrel **24** and this

heat is transferred to the hair by conduction through direct contact with the barrel 24.

Switch 12 may also control the ion system. Power from the switch 12 is connected to the ion generator 1, which is connected to an array of positive and negative electrodes. In the embodiment shown in Figure 3, the array includes anode pin or pins 2, and annular cathode ring or rings 3 with a central opening coaxial with the anode pins 2. Power from the ion generator drives the production of negative ions from this electrode array. A DC motor with an attached fan 4, propels air containing the ions through an air guide 6 into the barrel 24 and through the small openings 26 onto the hair of a user during use.

**[00013]** Another advantage of certain embodiments of the curling iron is the ease and safety of using the flipper. In contrast to curling irons in which the flipper actuator is on the barrel, in the embodiment shown, the flipper actuator 8 is in the handle portion 23 so the flipper can be actuated without extending the thumb over the barrel and risking a burn by accidentally touching the hot barrel. The flipper 7 is held in the closed position as shown in Figure 4 by the spring 10 attached to rod 11, biasing the flipper 7 in the closed position. The flipper actuator 8 is attached to rod 11 through the flipper linkage 9. Depressing the flipper actuator 8 (shown in Figure 3) raises the flipper 7 to the open position. This is accomplished without moving the thumb onto the barrel and is thus easier and safer than conventional flipper arrangements.

**[00014]** In certain preferred embodiments, a hair styling device as disclosed is a flat straightener or "flat iron" as shown in Figure 5. A flat straightener has two arms that are joined by a hinge at one end and have heated plates at their opposite ends. A flat straightener is typically biased in the open position and a user places her hair between the plates and then presses the arms together to style or straighten the hair between the two heated plates. The embodiment shown in Figure 5 includes a housing 50, and power cord 52. The power cord supplies power to the power switch 54, which is connected to the heaters 53 in each arm. The heater is adjacent the heater plate 51, which contacts the user's hair and supplies direct conductive heat for styling and straightening the hair. The heater plate is insulated from the housing by the heater plate isolator 63. The embodiment shown also includes an LED display 55, that indicates the state of the device to the user.

**[00015]** The flat straightener also provides the benefits of a flow of negative ions onto the hair of a user during use. The power switch is connected to an ion generator 58 that is

connected to an array of (+) 59 and (-) 60 electrodes for ion generation. The electrode arrays may be similar to those described for the curling iron embodiments, in which one or more anode pins are each disposed coaxially within the annular opening of one or more respective cathode rings. In the arm containing the electrodes, there is a small DC motor 56 with an attached fan 57. The fan directs air from the air inlets 61 formed in the housing, across the electrode array and out small holes 62 and onto the hair of a user during use. Additional features that are known in the art, such as adjustable temperature settings, for example, may also be included on any of the described embodiments.

**[00016]** All of the apparatus and methods disclosed and claimed herein can be made and executed without undue experimentation in light of the present disclosure. While the disclosure has been described in terms of preferred embodiments, it will be apparent to those of skill in the art that variations may be applied to the apparatus and/or methods and in the steps or in the sequence of steps of the methods described herein without departing from the concept, spirit and scope of the invention. All such similar substitutes and modifications apparent to those skilled in the art are deemed to be within the spirit, scope and concept of the invention as defined by the appended claims.